
TEXAS TECH UNIVERSITY
Natural Science Research Laboratory

Occasional Papers

Museum of Texas Tech University Number 309 28 June 2012

Mammals of Red Slough Wildlife Management Area, with Comments on McCurtain County, Oklahoma

Zachary P. Roehrs, Justin B. Lack, Craig E. Stanley, Jr., Christopher J. Seiden, Robert Bastarache, W. David Arbour, Meredith J. Hamilton, David M. Leslie, Jr., and Ronald A. Van Den Bussche

Abstract

Red Slough Wildlife Management Area (RSWMA) is located in the southeastern corner of Oklahoma, McCurtain County, and represents the extreme northwestern extent of the South Central Plains (SCP) ecoregion. Previous mammal research in southeastern Oklahoma has focused mostly on the Ouachita Mountains to the north of RSWMA. As a result, of the 69 species of mammals potentially occurring in McCurtain County, only 48 species represented by 599 voucher specimens reside in natural history collections. We present results from a mammal survey of RSWMA conducted from December 2009 to August 2010. We captured 574 non-volant small mammals in 9,115 trap-nights, 11 bats in 17 net-nights, and seven salvaged meso-mammals resulting in 157 voucher specimens of 22 mammal species, including the first specimen of *Castor canadensis* for McCurtain County, and photographic vouchers for eight additional species from RSWMA. These results provide a baseline for future studies on RSWMA and substantially increase our natural history knowledge for many relatively under-studied mammals in southeastern Oklahoma.

Key words: biodiversity, bottomland, faunal survey, feral, mammals, marsh, Oklahoma, Red River, slough, swamp, wetland

Introduction

Southeastern Oklahoma contains the northwestern most extent of the South Central Plains (SCP) ecoregion (Woods et al. 2005; Omernik 2007) making this a biologically unique region of the state. Floral studies in this region have focused largely on its forests because of their biodiversity, production value, and loss of bottomland hardwood forests (Little and Olmsted 1936; Brabander et al. 1985; Wilkinson et al. 1987; Hoagland et al. 1996; Hoagland and Buthod 2004; Hoagland and Johnson 2004; Taylor 2005; Hoagland and McCarty 2009). Studies of fauna in this region have been either broad taxonomic lists including little natural history data (e.g., Ortenburger 1926a, 1926b) or species-specific studies (e.g., Krupa 1986; Heck 1998, 2006; Riedle 2005; Arbour and Bastarache 2006).

The scientific study of mammalian diversity in this region is relatively recent and incomplete with early records of explorers and travelers making little mention of the mammalian fauna south of the Ouachita Mountains and east of the Muddy Boggy River. The Frenchman Bernard de la Harpe provided the first written record of mammals from this region during an excursion from his trading post on the Red River in Bowie County, Texas, north to near Tulsa, Oklahoma (Lewis 1924). Although la Harpe says little about the mammals they encountered while traveling through this region, he does mention that their guides killed two *Bison bison* and "some roebucks" (= male *Odocoileus virginianus*) near the present town of Rufe, Oklahoma, on 18 August 1719 (Lewis 1924:337). John Calvert [Juan Chalvert] traveled up the north shore of the Red River in 1794 and J. Saunders passed through southeastern Oklahoma in 1803 and 1804, but little record of their journeys exists (Loomis and Nasatir 1967; Flores 1985). Thomas Nuttall traveled through southeastern Oklahoma from 22 May to 14 June 1819 in what is today southeastern Choctaw County near the confluence of the Kiamichi and Red rivers (Nuttall 1821). He collected plants in the "Horse Prairie," named for the herds of wild horses in the area before settlement, but this is his only mention of mammals in this ecoregion. All other accounts from the Red River Valley are from much further west (e.g. Marcy 1854).

The first scientific survey of McCurtain County was conducted by the now Sam Noble Oklahoma Museum of Natural History in 1925 (Ortenburger 1926a), but only a few bat records were published from this survey (Ortenburger 1926b). Since that time, a number of studies have reported on mammals from southern McCurtain County (Whitaker 1937; Glass 1958; Glass and Ward 1959; McCarley 1961; Dolgos and Earls 1973; Reynolds 1977; Tyler and Scott 1982; Hatcher 1984; Schnell et al. 1985; Caire et al. 1988; Sheffield and Chapman 1992; Clark and Clark 1997; Shackelford and Whitaker 1997; White and Hoagland 1997; Heck 1998; McDonald 2006; Tumlison and Bastarache 2007; Barrett and Leslie 2010; Stevens 2010); however, few comprehensive surveys have been published giving us only a fragmented picture of the mammalian biodiversity in southeastern Oklahoma.

Over the last 20 years, the Red Slough Wetlands Restoration Project has conserved extensive wetlands and bottomland hardwood habitats generally degraded in this region. Today Red Slough Wildlife Management Area (RSWMA) is an important conservation area for Oklahoma and provides outdoor recreational and educational opportunities. In a continuing effort to document and understand the natural history and ecology of mammals in Oklahoma, we surveyed RSWMA to gather information on the composition and habitat affinities of its mammalian fauna and our results are useful for future conservation and management practices. Our results and other records from McCurtain County also provide baseline data for comparison with future research and serve as a benchmark for future studies of landscape change, invasion of non-native species, changing management practices, and potential effects of climate change.

METHODS

Study Area.—RSWMA is a 2,353 ha wetland restoration project in southeastern McCurtain County, Oklahoma (33.707–33.765° N and 94.605–94.703° W; Fig. 1). Elevation ranges from 95 m in the eastern portion of RSWMA near Push Creek to 126 m on some of the northern most upland areas. Climate is generally humid (43–99%) with hot summers (mean summer high = 32.2° C) and cold winters (mean winter low = 0° C; OCS 2010). Mean annual precipitation is 128.2 cm with precipitation fairly consistent throughout the year except for a drying period during late summer (July–August; OCS 2010). RSWMA lies in the Western Gulf Coastal Plain physiographic province and Dissected Coastal Plain geomorphic province of Oklahoma (Fenneman 1917; Curtis et al. 2008). The water table of RSWMA is high, ranging from at or near the surface in winter to 6.1 m below the surface in summer (Davis 1960). The high water table and the poorly drained soils of this area lead to periods of inundation producing the wetlands that historically existed in this area (Reasoner 1974). Push Creek transects RSWMA west to east and empties into the Red River approximately 3.2 km to the

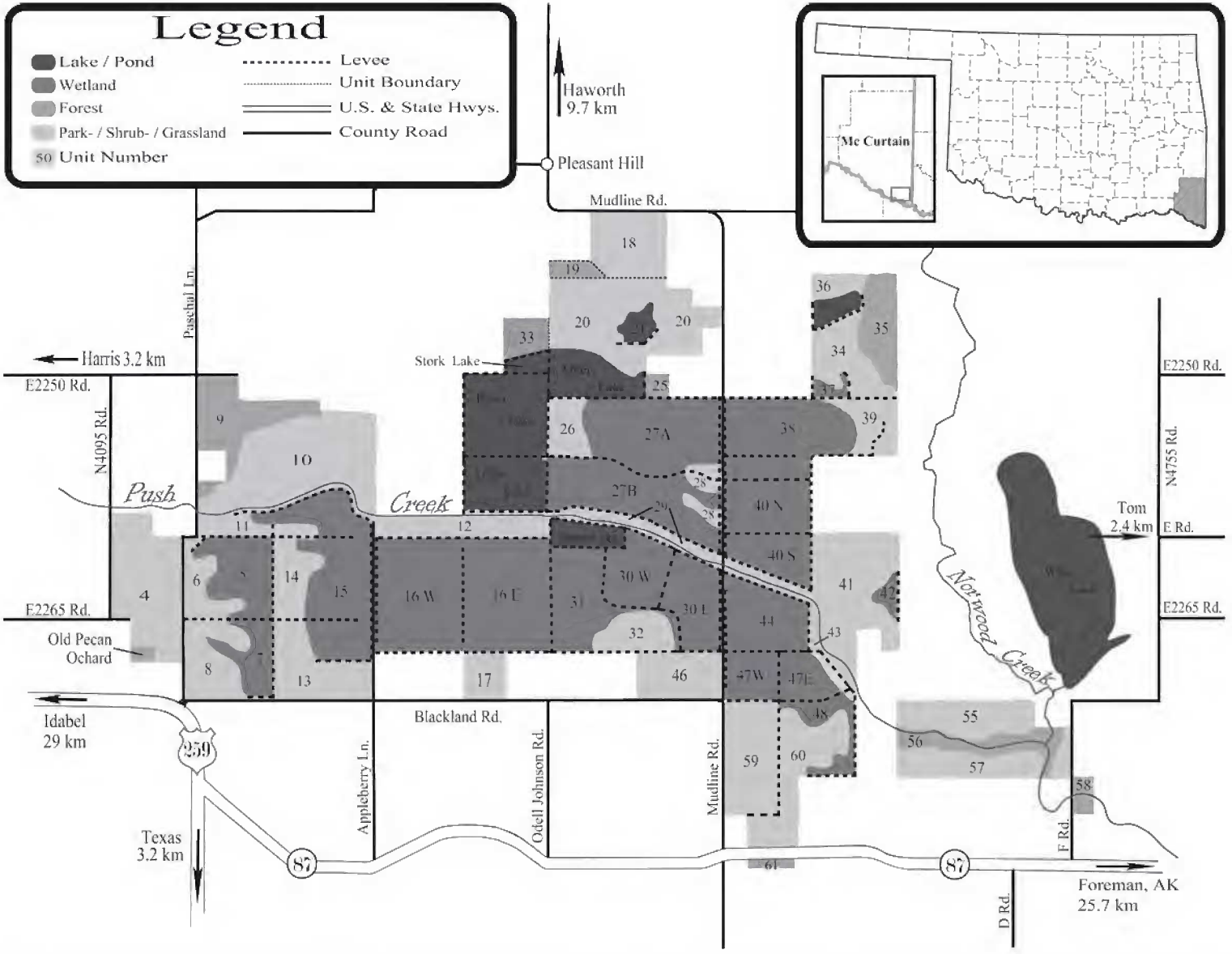

Figure 1. Map of Red Slough Wildlife Management Area depicting management unit numbers, dominant land cover, roads, and levees. Map modified with permission from the U.S. Forest Service map (USFS 2009).

southeast. RSWMA sits at the northwestern extent of the SCP ecoregion (Level III) predominantly in the Red River Bottomlands, but northern areas extend just into the Pleistocene Fluvial Terraces (Level IV; Woods et al. 2005; Omernik 2007). The SCP ecoregion contains the western-most populations of southern coniferous forest and northwestern-most populations of southern floodplains forest. Moreover, it is in this ecoregion where these forests transition into the oak-hickory forest and grassland that are dominant to the north and west (Blair and Hubbell 1938; Woods et al. 2005; Omernik 2007).

Historically, the area that is now RSWMA was dominated by bottomland hardwood forests, and constituted one of the largest wetland complexes in Oklahoma; it was converted into agriculture in the 1960s by wetland drainage, channelization of Push Creek, and forest clearing. In the 1980s, levees and water control structures were built for rice production on parts of the area. In 1996, much of this area was enrolled in the Natural Resources Conservation Service, Wetlands Reserve Program by landowner Phillip Hogan. From 1997–2004, parts of what is now known as RSWMA were purchased by The Conservation Fund and donated to the U.S. Forest Service (USFS; Meek 2005). RSWMA is now jointly administered and managed by the Oklahoma Department of Wildlife Conservation (ODWC), USFS, and the Natural Resources Conservation Service with support from Ducks Unlimited and the U.S. Fish and Wildlife Service. Water-control structures were improved or built to seasonally flood management units and promote wetland and bottomland forest habitats (Fig. 1). Drier upland sites are managed as upland forests or with prescribed fire and mowing to maintain parkland and shrubland habitats.

Vegetation.—The flora of RSWMA was inventoried by Hoagland and Johnson (2004), and research on forest trees and shrubs has been conducted in the area (Little and Olmstead 1936; Brabander et al. 1985; Wilkinson et al. 1987; Taylor 2005; Hoagland and McCarty 2009). The habitats we sampled on RSWMA can be divided into six general types: forest, grassland, parkland, shrubland, and wetland. Descriptions of vegetation types and subtypes on RSWMA are based on Hoagland (2000) and Hoagland and Johnson (2004) where applicable (Fig. 1; Table 1). For more extensive description of vegetation and site photographs contact the authors or see field notes deposited in the Oklahoma State University, Collection of Vertebrates (OSU).

Sampling.—Historical data on the mammals of McCurtain County were gathered from personnel and records at RSWMA and from specimen data in the Mammal Networked Information System (MaNIS; http://www.manisnet.org/, accessed 15 November 2010), and natural history collections (Appendix). We surveyed the mammalian fauna on RSWMA from 14–19 December 2009, 21–27 May 2010, 21–27 June 2010, and 17–22 July 2010 primarily focusing on terrestrial small mammals. Collecting localities were chosen to sample the diversity of habitats present on RSWMA and therefore were not random. Non-volant mammals were trapped using two methods: transects of Sherman live traps (H. B. Sherman Traps, Tallahassee, FL) consisting of 50 traps per transect, and pitfall traps set in "Y" shaped arrays with a 5-gallon bucket at the end of each arm and in the middle of the "Y." Each arm consisted of plastic edging 2.4 m in length and 10 cm height above ground. Sherman traps were baited with rolled oats and chicken scratch, set in late afternoon, and picked up in the early morning each day. Pitfall traps were set in two localities on the northern end of unit 18 during summer months and were checked twice daily. The majority of RSWMA is made up of wetlands with deep-water reservoirs, periodically flooded shallow water impoundments, moist soil units, vernal pools, springs, and flowing water types of wetlands, some of which are forested. Because of this, small mammal trapping was only conducted in areas with < 8 cm of standing water. Volant mammals were sampled using mist nets (Avinet, Inc., Dryden, NY) over creeks and levees. Nets were opened at sunset and closed by 0100 h. Voucher specimens were also collected opportunistically (e.g., salvage of dead animals or those killed by management practices). All sampling was conducted using protocols approved by the Oklahoma State University, Institutional Animal Care and Use Committee, following guidelines of the American Society of Mammalogists (Gannon et al. 2007), and under permits issued by the ODWC. Voucher specimens (including tissues and embryonic material) are deposited at OSU. Garmin GPS 12XL handheld receivers (Olathe, KS) set on the World Geodetic System of 1984 Geodetic Reference System Locality coordinates were used to record uncorrected Universal Transverse Mercator units for each locality sampled.

Table 1. Vegetation types and subtypes trapped on Red Slough Wildlife Management Area, with general description and management units they dominate (Units; Fig. 1). Areas were grouped based on similar plant community and structure. General description is based on Hoagland (2000) where appropriate; otherwise, brief description with dominant species is provided. Units in which subtypes can be found are provided except for Parkland, Wetland, and Shrubland, which can be found in most units (Fig. 1).

Type	Subtype	General Description	Units
Forest	Bottomland hardwood	*Liquidambar styraciflua*, *Quercus lyrata*, *Q. nigra*, or *Q. phellos* forest alliances.	19, 25, 35, 56, 58
	Loblolly pine plantings	*Pinus taeda* plantings: *P. taeda* / *Rhus copallina* or *P. taeda* - *Fraxinus pennsylvanica* - *Ulmus americana* / *Chasmanthium sessiliflorum* forest associations.	9, 33, northern 35
	Osage-Orange	*Maclura pomifera*, *Arundinaria gigantea*, *Sabal minor*, *Equisetum* sp.	58
	Riparian	*Salix nigra* woodland association or associations of the *Populus deltoides* forest alliance. Other than unit 61, found along Push Creek, wetlands, and reservoirs edges.	61, see general description
	Pecan	Old pecan orchard, *Carya illinoensis* (pecan) - *C. laevigata* forest association.	southwest 4
Grassland	*Andropogon* / *Panicum*	*Andropogon virginicus* / *Panicum oligosanthes*	20, 34
	Andropogon / *Avena*	*Andropogon virginicus*, *Avena fatua*, *Lolium perenne*	6, 8, 11, 17
	Forb dominated	*Solidago* sp., *Ambrosia trifida*, *Helianthus* sp., *Rosa* sp., and *Rubus* sp.	18, 57, 60
	Disturbed	*Cynodon dactylon*, *Digitaria sanguinalis*, *Sorghum halepense*, *Trifolium* sp. and *Zizaniopsis miliacea* in wet areas.	Levees
Parkland	Parkland	Codominant forest and grassland components with open grassland-like vegetation, a scattering of mature trees, and small dense patches of shrubs.	Common across WMA.
Wetland	Deep-water reservoirs (margins)	Diversity of wetlands present on WMA with deep-water reservoirs, periodically flooded shallow water impoundments, moist soil units, vernal pools, springs and flowing water types of wetlands, some of which are forested. Include: *Juncus effusus*, *Typha latifolia*, *Z. miliacea* herbaceous associations, and associations of the *Polygonum* sp. (section *persicaria*) herbaceous alliance.	Complex wetland communities found in almost every unit in WMA.
	Moist soil units		
	Drained shallow water impoundments		
Shrubland	*Baccharis* shrubland	*Baccharis halimifolia*, understories depend on soil saturation: if dryer, like grasslands; if wetter, like moist soil wetland units.	Common across WMA.

RESULTS

We captured 574 non-volant small mammals in 9,115 trap-nights (6% trap success), 11 volant mammals in 17 net nights (65% net success), and seven mesomammals were salvaged (Table 2). Four species made up 87% of all captures combined. In decreasing number of captures they were, *Reithrodontomys fulvescens* (238 individuals), *Oryzomys texensis* (100), *Peromyscus gossypinus* (90), and *Sigmodon hispidus* (88). We caught four times the number of animals in December than any other month in which we trapped (Table 2). This was due to the large number of *R. fulvescens* caught during this trapping period. Interestingly, we only captured *Ochrotomys nuttalli* and *Glaucomys volans* in December (Table 2). In winter we typically caught more females than males of most species and as summer progressed, we tended to catch more males than females (Table 2). In our survey of bats, all individuals caught were examined for signs of fungal infection or history of tissue damage to the wings, symptomatic of White-nose Syndrome after hibernation (Meteyer et al. 2009; Cryan et al. 2010). No signs of White-nose Syndrome were observed on any bats caught.

Didelphis virginiana Kerr 1792
Virginia Opossum

D. virginiana has been collected from all physiographic regions in Oklahoma (Caire et al. 1989), however, only three voucher specimens are known from McCurtain County (Appendix). *D. virginiana* is a habitat generalist but tends to favor mesic habitats, when available, like those present on RSWMA (McManus 1974). We provide a fourth voucher specimen from McCurtain County collected along a levee between Otter Lake and Unit 27A in RSWMA (Fig. 1; Table 2; Appendix).

Dasypus novemcinctus Linnaeus 1758
Nine-banded Armadillo

D. novemcinctus has been on a well-documented northward expansion in the United States (Taulman and Robbins 1996; Platt et al. 2009). Despite a paucity of voucher specimens, *D. novemcinctus* is distributed across Oklahoma (Caire et al. 1989; Braun and Revelez 2005; Roehrs et al. 2008; Braun et al. 2011). Two voucher specimens exist from McCurtain County (Appendix), but none have been recorded from RSWMA. We provide a photograph voucher taken on the shore of Bittern Lake, 31 July 2007 (by author WDA; Figs. 1 and 2a). This individual was digging up and eating eggs of an unidentified turtle species.

Glaucomys volans (Linnaeus 1758)
Southern Flying Squirrel

G. volans is known from scattered records across eastern and southern Oklahoma and little is known about its ecology and natural history in the state (Caire et al. 1989; Stangl et al. 1992; Braun and Revelez 2005; McDonald et al. 2007). Only two voucher specimens represent this species in McCurtain County (Appendix). We contribute an additional voucher specimen caught during December in an area of transition from loblolly pine into bottomland hardwood forest in northern Unit 35 (Fig. 1; Tables 1 and 2; Appendix). This female specimen was not pregnant or lactating.

Castor canadensis Kuhl 1820
American Beaver

C. canadensis was historically distributed across the United States (Jenkins and Busher 1979) and occurred in high numbers across Oklahoma (Reynolds 1977; Caire et al. 1989). By the early 1900s, *C. canadensis* was nearly extirpated from Oklahoma due to overexploitation for the fur trade, with relict populations surviving in only a few river drainages (Cross 1917; Blair 1939; Jones 1952). Through management and restocking, *C. canadensis* has returned to an essentially statewide distribution (Caire et al. 1989). At RSWMA, this species is controlled because of the damage it can cause to the levee system. Records indicate that a mean of 29 *C. canadensis* per year (range 12–47/year) were removed from RSWMA between 2006–2010 to mitigate damage to water control structures, including four individuals for which we were able to salvage skulls (Table 2; Appendix). In spite of the widespread nature of this species, these are the first voucher specimens of *C. canadensis* from McCurtain County. Given the mix of wetlands, creeks, and forests

Table 2. Total captures by species and sex from four trapping sessions at Red Slough Wildlife Management Area. Numbers appearing between female (F) and male (M) columns are individuals where sex is unknown.

Taxon	December			May			June			July			Totals			
	F		M	F		M	F		M	F		M	F		M	All
Didelphis virginiana	0	1	0	0		0	0		0	0		0	0	1	0	1
Glaucomys volans	1		0	0		0	0		0	0		0	1		0	1
Castor canadensis	2		0	0		0	0		0	1		1	3		1	4
Microtus pinetorum	0		0	1		0	1		0	0		0	2		0	2
Neotoma floridana	2		2	0		0	4		0	0		0	6		2	8
Ochrotomys nuttalli	4		2	0		0	0		0	0		0	4		2	6
Peromyscus gossypinus	14		11	13		10	9		6	7		20	43		47	90
Peromyscus leucopus	3		3	1		0	2		2	0		1	6		6	12
Peromyscus maniculatus	0		0	1		1	2		1	0		0	3		2	5
Reithrodontomys fulvescens	123		106	1		1	0		2	0		5	124		114	238
Oryzomys texensis	24		18	2		17	5	1	8	10		15	41	1	58	100
Sigmodon hispidus	14		11	9	4	8	17	1	13	3		8	43		40	88
Mus musculus	0		0	0		0	0		0	0		1	0		1	1
Myocastor coypus	0	1	0	0		0	0		0	0		0	0	1	0	1
Blarina carolinensis	1		1	0		1	1		1	0		1	2		4	6
Cryptotis parva	1		0	2		4	3		3	3		1	9		8	17
Lasiurus borealis	0		0	2		0	2		0	0		0	4		0	4
Lasiurus seminolus	0		0	1		0	0		0	0		0	1		0	1
Myotis austroriparius	0		0	5		0	0		0	0		0	5		0	5
Myotis lucifugus	0		0	0		1	0		0	0		0	0		1	1
Lontra canadensis	0		0	0		0	1		0	0		0	1		0	1
Totals	345			85			85			77						592

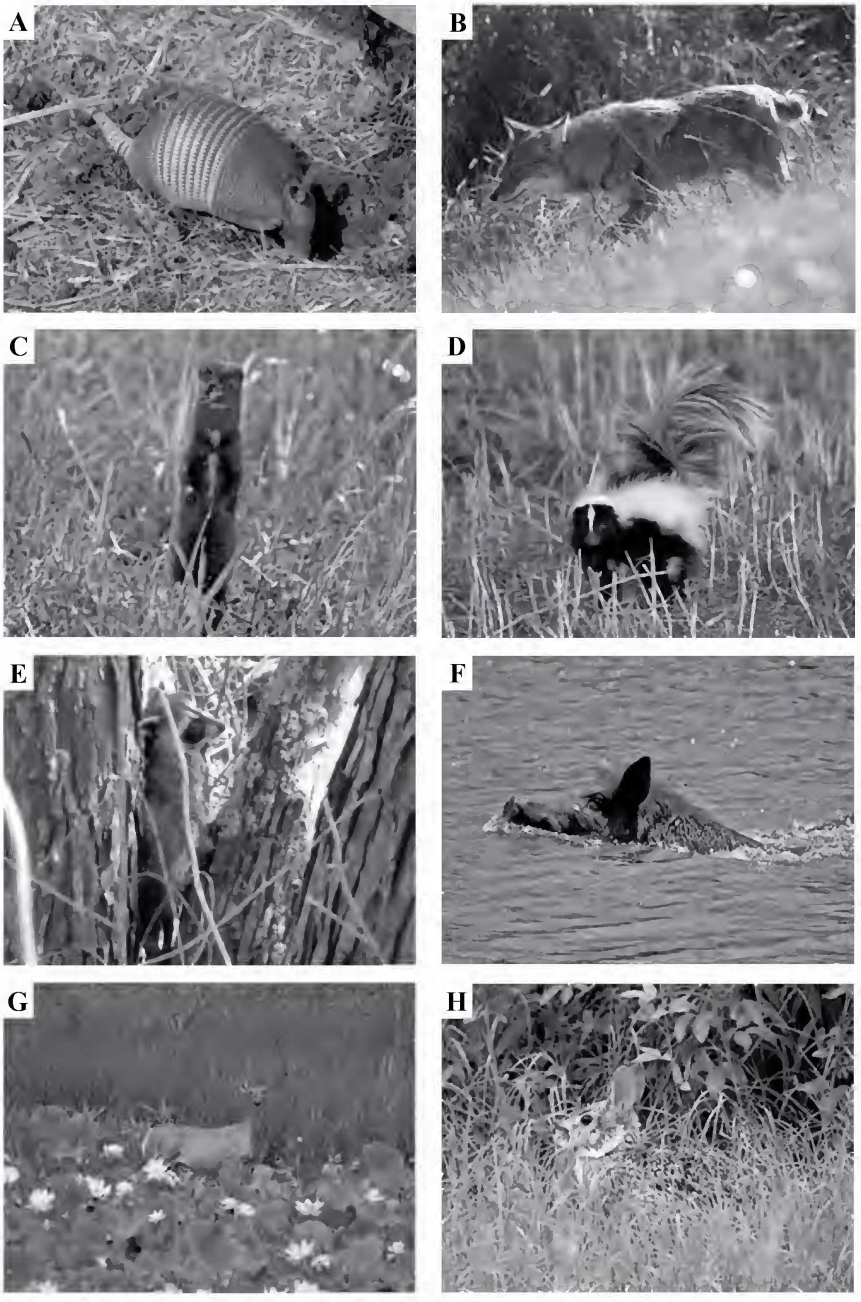

Figure 2. Photographic vouchers of mammals from Red Slough Wildlife Management Area. Pictures are property of the U.S. Forest Service. A) *Dasypus novemcinctus* by W. David Arbour on Bittern Lake, 31 July 2007. B) *Canis latrans* by Berlin A. Heck, 2 January 2010 on Pintail Lake levee. C) *Neovison vison* by Berlin A. Heck in unit 38, 20 May 2010. D) *Mephitis mephitis* by Berlin A. Heck, 19 February 2008 in unit 44. E) *Procyon lotor* by Zachary P. Roehrs, 24 May 2010, south side of levee separating units 6 and 8. F) *Sus domesticus* by W. David Arbour in unit 5, 8 June 2009. G) *Odocoileus virginianus* by Berlin A. Heck, 25 July 2007 in Bittern Lake. H) *Sylvilagus aquaticus* by W. David Arbour at Bittern Lake, 12 May 2009.

prevalent in this area, *C. canadensis* is common on RSWMA (Fig. 1).

Geomys breviceps Baird 1855
Baird's Pocket Gopher

G. breviceps is found across eastern Oklahoma (Caire et al. 1989; Sulentich et al. 1991), but despite extensive study of this species in Oklahoma, only eight voucher specimens have been collected from McCurtain County (Appendix). Color variation is well documented in *Geomys*, and leucistic individuals of *G. breviceps* have been previously documented in Bryan County, Oklahoma (McCarley 1951). We report a leucistic individual collected in bottomland hardwood forest of unit 19 on RSWMA by Jack Ferguson (USFS, Technician) on 10 October 2009, and preserved in the Oklahoma Ranger District, Ouachita National Forest Office, Broken Bow, Oklahoma (Appendix; Fig. 1; Table 1).

Microtus pinetorum (Le Conte 1830)
Woodland Vole

M. pinetorum is found across all but the last tier of western counties in the body of Oklahoma (Caire et al. 1989; Clark and Tumlison 1992; Stangl et al. 1992; Braun and Revelez 2005; McDonald et al. 2006; Roehrs et al. 2008; Braun et al. 2011), but is documented in McCurtain County by only six voucher specimens (Appendix). We collected two females on RSWMA, of which one was captured in May and was not pregnant; the other was collected in June and was pregnant with two embryos (Table 2; Appendix). The specimen collected in May was found freshly deceased on a rarely used service road in unit 18, which consists of very open hardwood parkland with a dense forb dominated ground cover, whereas the individual captured in June was from the late successional riparian forest in unit 61 (Fig. 1; Table 1). Despite an additional 466 trap-nights in unit 18 (including Sherman and pitfall traps) and 499 trap-nights in unit 61, no other *M. pinetorum* were captured. Since *M. pinetorum* is semifossorial it may have limited distribution in this region of McCurtain County and on the management area due to the fact that much of RSWMA is flooded seasonally and soils in upland sites are saturated throughout the winter.

Neotoma floridana (Ord 1818)
Eastern Woodrat

N. floridana is known to occur throughout most of Oklahoma (Caire et al. 1989; Clark and Tumlison 1992; Stangl et al. 1992; Braun and Revelez 2005; Roehrs et al. 2008). Twenty-one voucher specimens have been collected from McCurtain County (Appendix), and to this dataset we add seven additional voucher specimens from RSWMA all captured in bottomland hardwood and riparian forests or dense woody patches in parkland habitats (Tables 1; Appendix). Of the eight individuals caught in December and June, six were female but none was pregnant or lactating (Table 2). One released female had a *Cuterebra* sp. warble on her neck.

Ochrotomys nuttalli (Harlan 1832)
Golden Mouse

O. nuttalli reaches the northwestern edge of its distribution in southeastern Oklahoma (Linzey and Packard 1977) and has been documented from four counties in the state (Le Flore, McCurtain, Pushmataha, Sequoyah—Osgood 1909; Blair 1939; Caire et al. 1989; Braun et al. 2011). Only seven voucher specimens from McCurtain County are in natural history collections and we add six additional specimens from RSWMA, all caught in December (Table 2; Appendix). The four females caught were not pregnant or lactating. Habitat affinities were loblolly pine parkland with forb dominated understory (unit 18) or were associated with dense tangles of *Smilax* sp. in bottomland hardwood forest (unit 35 and along Teal Lake; Fig. 1; Table 1).

Peromyscus gossypinus (Le Conte 1853)
Cotton Deermouse

P. gossypinus reaches the northwestern extent of its range in southeastern Oklahoma, with voucher specimens documented from seven counties (Caire et al. 1989; Payne and Caire 1999). In our survey, *P. gossypinus* was one of the most common captures (Table 2). We collected 22 individuals of 90 captured from RSWMA, increasing by 35% the 63 voucher specimens of this species from McCurtain County previously deposited in collections (Appendix). In December 2009, we captured one pregnant female, as

well as multiple lactating individuals, but collected no lactating or pregnant females during the summer trapping sessions. This is consistent with previous studies of *P. gossypinus* that documented breeding behavior in Florida and Texas was decreased in June–September (Pournelle 1952; McCarley 1954). On RSWMA, *P. gossypinus* was commonly captured in all forest types, and periodically captured in parkland and edge habitats (Fig. 1; Table 1).

Peromyscus leucopus (Rafinesque 1818)
White-footed Deermouse

P. leucopus is one of the most common rodents in Oklahoma with documented records in all but Lincoln County (Caire et al. 1989). Although this species is common in Oklahoma, only 35 voucher specimens have been collected in McCurtain County and we add 11 additional specimens from 12 total individuals captured (Table 2; Appendix). None of the four adult females collected in December (n = 2) and June (n = 2) were pregnant or lactating. Due to its extensive distribution, *P. leucopus* has been documented in a variety of wooded habitats, and is sometimes caught in grassy habitats, though is typically replaced by *P. maniculatus* in prairies. In this region, *P. leucopus* is often replaced by *P. gossypinus* in more continuous forest stands and only seems to be found in edge habitats. On RSWMA, individuals were mainly caught in edge habitat with a woody component including loblolly pine and bottomland hardwood forest edge (especially with eastern red cedar), pine and hardwood parklands, *Baccharis* shrublands, and from the old pecan orchard (Fig. 1; Table 1).

Peromyscus maniculatus (Wagner 1845)
North American Deermouse

P. maniculatus is distributed throughout Oklahoma, most commonly occurring in open grassland habitats. Where habitats transition to more woody or shrubby vegetation *P. maniculatus* tends to be replaced by *P. leucopus*. Caire et al. (1989) noted the exclusion of *P. maniculatus* from the Cypress-Oak Floodplain Physiognomic Region in the southeastern corner of the state. Braun and Revelez (2005) have since added seven voucher specimens from McCurtain County and an additional two individuals reside in the collection at the University of Central Oklahoma (Appendix). We collected five additional voucher specimens from four localities (Table 2; Appendix). All individuals were collected during the summer including three females of which none was pregnant or lactating. Individuals were caught on RSWMA in *Andropogon* / *Avena* dominated or forb dominated grassland habitats with few woody species (at least by trap; Fig. 1; Table 1). Based on our results and those of Braun and Revelez (2005), it is clear that *P. maniculatus* can be found in this ecoregion and McCurtain County, but are likely limited to grasslands with little woody structure.

Reithrodontomys fulvescens Allen 1894
Fulvous Harvest Mouse

Historically restricted to eastern Oklahoma, *R. fulvescens* is now found across most of the state (Caire et al. 1989; Clark and Tumlison 1992; Stangl et al. 1992; Thies et al. 1993; Braun and Revelez 2005; McDonald et al. 2006; Roehrs et al. 2008). The species was first collected in 1934 from McCurtain County and since then 13 voucher specimens have been collected, with one of these specimens being collected from RSWMA (Appendix). We add 17 additional voucher specimens collected from 14 localities on RSWMA (Table 2; Appendix). In total we captured 238 *R. fulvescens* from RSWMA of which 96% were caught in December (Table 2). Of the females captured in December (n = 123), only one was pregnant and the only female caught in May was pregnant with four embryos. We captured juveniles in December and July, which correspond with other literature (Spencer and Cameron 1982). On RSWMA, *R. fulvescens* was captured in shrubby grasslands and grassland / forest edge including bottomland hardwood or loblolly pine parkland, riparian shrubby habitats, or *Baccharis* shrublands (Fig. 1; Table 1).

Oryzomys texensis (Allen 1894)
Texas Rice Rat

Previously a member of *Oryzomys palustris*, subspecies *O. p. texensis* has been elevated to species rank (Hanson et al. 2010). *O. texensis* reaches the northwestern extent of its distribution in southeastern

Oklahoma (McCarley 1961; Wolfe 1982; Caire et al. 1989; Gettinger 1991; Braun and Revelez 2005; McDonald et al. 2006; Braun et al. 2011). Only 10 voucher specimens from three localities represent this species in McCurtain County (Appendix). We add an additional 21 voucher specimens collected from 16 localities on RSWMA (Table 2; Appendix). Of the 100 *O. texensis* captured, 41 were female, and six were pregnant. These pregnant females were caught in June and July and averaged four embryos (range = 2–5). This was one of the most commonly caught species on RSWMA (Table 2), primarily captured in wetland type habitats preferred by *O. texensis* (Caire et al. 1989; Fig. 1; Table 1). These data also support the recently documented seasonal movements of *O. texensis* into upland habitats in the winter and spring when water levels of this region rise and resources are scarce (Kruchek 2004). It was primarily in December when this species was captured in riparian forest, grasslands, and shrublands on RSWMA (Fig. 1; Table 1).

Sigmodon hispidus Say and Ord 1825
Hispid Cotton Rat

S. hispidus is found throughout Oklahoma (Caire et al. 1989) and is one of the most well documented species from McCurtain County with 38 previously collected voucher specimens, 10 of which are from RSWMA (Appendix). During our surveys, *S. hispidus* was the fourth most commonly trapped species, making up 15% of the individuals captured on RSWMA with 88 total captures (Table 2). We add 21 additional voucher specimens from 17 localities (Appendix). As would be predicted for this species, we commonly caught them in parkland, edges of riparian and bottomland hardwood forests, and in dense microhabitats of forb dominated grasslands (Fig. 1; Table 1). Cameron and Kruchek (2005) found that abundance of *S. hispidus* and *Oryzomys* in wetlands was negatively related and we generally observed a similar pattern at RSWMA. *S. hispidus* is capable of breeding throughout the year in southeastern Oklahoma (Caire et al. 1989), but we only captured juveniles in May, June, and July, and of the 11 adult females collected in all seasons surveyed, they were pregnant only in May and June. Litter size of those females averaged 7.6 (range 6–11) embryos, falling within normal reported ranges (1–15—Cameron and Spencer 1981). Orange patches of Trombiculidae larvae were found on a number of individuals especially on the ears and groin.

Mus musculus Linnaeus 1758
House Mouse

In North America, *M. musculus* is a cosmopolitan commensal commonly found in manmade structures or around agricultural fields and other disturbed sites (Kaufman and Kaufman 1990; Clark and Clark 1996). The house mouse was first documented in McCurtain County in 1990 (Sheffield and Chapman 1992). We collected another voucher specimen in a late successional riparian forest (unit 61—Fig. 1; Tables 1 and 2; Appendix). This habitat is unusual for *M. musculus*, but "feral" individuals have been documented away from human structures and disturbed sites and unit 61 is seasonally flooded, being a former channel of the Red River (Kaufmann and Kaufmann 1990; Sheffield and Chapman 1992; Clark and Clark 1996). This individual was a male, which are more prone than females to disperse, and four human structures are less than a quarter-mile away, which may represent potential source populations (Pocock et al. 2005). Little is known of the ecology and natural history of this now permanent member of North American communities and rigorous study is required.

Myocastor coypus (Molina 1782)
Coypu

Native to southern South America (Woods et al. 1992; Carter and Leonard 2002), *M. coypus* was introduced into North America as early as 1899 with expanded introductions in the 1930s (Jojola et al. 2005). Feral populations in the United States became established from fur farms and intentional introductions, and thus have expanded across the southeastern and northwestern United States (Carter and Leonard 2002; Jojola et al. 2005). Although first introduced in Oklahoma in the 1950s, little information is available on the distribution of coypu in the state. The most current data are almost 40 years old and come from four counties (Caddo, Comanche, Garvin, McCurtain—Glass and Halloran 1961; Dolgos and Earls 1973; Caire et al. 1989). Four voucher specimens are reported from McCurtain County and to this dataset we add a

single specimen collected by Terry Stuart (Technician, ODWC) on the northern end of Otter Lake on RSWMA (Dolgos and Earls 1973; Fig. 1; Table 2; Appendix). Coypu are known to have breeding populations within RSWMA as well as on Ward Lake (Dolgos and Earls 1973). Recently, coypu have been targeted for control on RSWMA, with 22 individuals removed in December 2010.

Sylvilagus aquaticus (Bachman 1837)
Swamp Rabbit

With a distribution throughout the southeastern one-half of Oklahoma, *S. aquaticus* is believed to be in decline due to the destruction of its preferred habitat in mesic areas surrounding wetlands, lakes, and streams (Caire et al. 1989). It has been over 50 years since there have been any studies targeting this species in Oklahoma. Only three voucher specimens occur from McCurtain County (Appendix). We frequently sighted *Sylvilagus* of generally large size having shorter round ears, a cinnamon-brown eye ring, course gray-rufus-brown pelage and a high proportion of black guard hairs on RSWMA that we attribute to *S. aquaticus* (Chapman and Feldhamer 1981; Caire et al. 1989). We provide a photographic voucher of this species from Bittern Lake taken on 12 May 2009 (by author WDA; Figs. 1 and 2h).

Blarina carolinensis (Bachman 1837)
Southern Short-tailed Shrew

B. carolinensis reaches its northwestern distribution in southeastern Oklahoma (McCay 2001). Until recently, only six voucher specimens from five localities in McCurtain County were known from the state (Appendix). Braun et al. (2011) expanded the known distribution and our knowledge of this species in Oklahoma by collecting 81 voucher specimens from one locality in Le Flore County. We add six more voucher specimens from five localities in McCurtain County (Table 2; Appendix). Identification is based on locality and small size of these individuals with mean total length of 86.2 mm (81–92 mm) and mean weight 6.6 g (5–8 g) for six adults (George et al. 1981; Braun et al. 2011). Of the two females captured in December and June, neither were pregnant or lactating. This is consistent with spring and autumn breeding documented in other studies (Genoways and Choate 1998; McCay 2001). This species may be more common in this part of Oklahoma than records indicate, but more targeted study is required. Future research needs to focus on the distribution of this species in Oklahoma, especially in relation to its congeneric *B. hylophaga*, mapping their contact zone, and looking for potential areas of sympatry and hybridization. On RSWMA, *B. carolinensis* was most commonly caught in loblolly pine or bottomland hardwood parkland with a dense, forb-dominated understory of goldenrod, but were also caught in riparian forest bordering wetlands or in upland loblolly pine forest near wet meadows (Fig. 1; Table 1).

Cryptotis parva (Say 1823)
North American Least Shrew

Despite the paucity of museum records, *C. parva* is likely a common species in eastern Oklahoma and is found throughout much of the state (Caire et al. 1989; Dalquest et al. 1990; Stangl et al. 1992; Braun and Revelez 2005; McDonald et al. 2006). Only one voucher specimen is known from McCurtain County (Appendix). The lack of voucher specimens likely reflects species capture biases in the methods used to catch small mammals (e.g., Sherman live traps vs. pitfall traps) and frequency of trapping rather than species abundance; *C. parva* may be locally abundant, but patchily distributed (Fitch 1954; Whitaker 1974). We report 17 voucher specimens collected from six localities on RSWMA, of which 13 (76%) were caught in pitfall traps (Table 2; Appendix). All but one individual were caught in summer, and individuals were captured between 1800–0700 h. Despite being caught in all months surveyed, none of the nine captured females was pregnant or lactating. Individuals were primarily captured in parkland with dense forb dominated ground cover or in riparian forest (Fig. 1; Table 1).

Lasiurus borealis (Müller 1776)
Eastern Red Bat

L. borealis is considered one of the most broadly distributed bats in the United States and is commonly associated with forested areas (Caire et al. 1989). Although most records of this species in Oklahoma come from eastern and central parts of the state, it is likely that

it lives throughout the state, but is confined to riparian corridors in the west (Caire et al. 1989; Dalquest et al. 1990; Roehrs et al. 2008). Previously, no voucher specimens have been collected from RSWMA, but 63 individuals from 21 localities have been collected throughout McCurtain County over the past 80 years (Appendix). We caught this species at two locations on RSWMA along Push Creek in May (n = 2) and June (n = 2) and provide two voucher specimens (Table 2; Appendix). The May netting location was on a levee between Push Creek and Bittern Lake dominated by riparian forest habitat whereas the June locality was in Osage-orange forest (Fig. 1; Table 1). Two females caught on 21 May 2010 were pregnant, and one of the two females caught on 25 June 2010 was lactating, which parallels other reproductive data from *L. borealis* in this region (Saugey et al. 1998).

Lasiurus seminolus (Rhoads 1895)
Seminole Bat

L. seminolus was first collected in Oklahoma by Claud Ward in 1954 from the Little River, McCurtain County (Glass 1958; Caire and Thies 1987; Caire et al. 1989; Clark and Clark 1997; Appendix). Since 1954, only two additional voucher specimens have been captured in Oklahoma; one in Murray County (Caire and Thies 1987) and another in McCurtain County on North Cedar Creek (Clark and Clark 1997). We provide the fourth voucher specimen from Oklahoma and first capture from RSWMA (Table 2; Appendix). This individual was captured in a net set over a levee service road surrounded by riparian forest between Push Creek and Bittern Lake (Fig. 1; Table 1). This specimen was a pregnant female captured on 22 May 2010 and had four embryos.

Myotis austroriparius (Rhoads 1897)
Southeastern Myotis

M. austroriparius has only been reported from three southeastern Oklahoma counties (Le Flore, McCurtain, Pushmataha; Glass and Ward 1959; Caire et al. 1989; Jones and Manning 1989). Previously, 12 voucher specimens of this species had been collected in McCurtain County (Appendix). We captured five individuals and provide two voucher specimens from one locality (Table 2; Appendix). All individuals caught were adult females and none were pregnant, but all individuals also had bright orange pelage that could indicate current (or at least recent) maternity colony roosting (LaVal 1970). These individuals were caught over an unnamed tributary of Norwood Creek in bottomland hardwood forest of unit 35 (Fig. 1; Table 1). These bats were likely roosting in the forest because no caves are near this locality.

Myotis lucifugus (Le Conte 1831)
Little Brown Myotis

Despite a distribution covering much of North America (Fenton and Barclay 1980), *M. lucifugus* is only known from two counties in Oklahoma (Delaware and McCurtain), with all 30 previous voucher specimens from McCurtain County coming from Beaver's Bend State Park from 1954–1967 (Glass and Ward 1959; Caire et al. 1989; Appendix). We add an additional voucher specimen and locality from McCurtain County (Table 2; Appendix). This individual was caught in May over a small tributary of Norwood Creek in the bottomland hardwood forest of unit 35 (Fig. 1; Table 1). This single male was likely roosting in the forest on, or near RSWMA. A study investigating the distribution, roosts, and habitat use of *M. lucifugus* in Oklahoma is needed, especially considering the impact of White-Nose Syndrome on this species in the northeastern United States (Cryan et al. 2010).

Canis latrans Say 1823
Coyote

Found across Oklahoma (Caire et al. 1989; Braun and Revelez 2005), *C. latrans* is known from 14 voucher specimens collected in McCurtain County (Appendix). This species was often heard at night on RSWMA, and we provide a photograph voucher of *C. latrans* taken on 2 January 2010 by Berlin A. Heck on Pintail Lake levee (Figs. 1 and 2b).

Lontra canadensis (Schreber 1777)
North American River Otter

L. canadensis is recovering through natural population growth and reintroduction from low population numbers and regional extirpation across much

of its former distribution in North America (Raesly 2001; Barrett and Leslie 2010). Recent research in Oklahoma documents the presence of this species across the eastern one-half of the state with some of the highest densities in southeastern Oklahoma, including McCurtain County (Barrett and Leslie 2010). We provide a third voucher specimen of *L. canadensis* for the county that was a non-target capture in a conibear trap used to manage *C. canadensis* on RSWMA (Table 2; Appendix). This specimen was caught along the levee south of Push Creek under riparian forest in June (Fig. 1; Table 1) and had no embryos, but was lactating consistent with known reproductive cycles (Caire et al. 1989; Larivière and Walton 1998). With a growing population of *L. canadensis*, further ecological data and monitoring of these populations are required.

Neovison vison (Schreber 1777)
American Mink

N. vison is known from the southeastern three-quarters of Oklahoma (Caire et al. 1989; Stangl et al. 1992; Larivière 1999; Braun and Revelez 2005) and despite being a commonly captured furbearer, only one voucher specimen exists from McCurtain County (Appendix). We provide photo documentation of this species from RSWMA, unit 38, taken by Berlin A. Heck on 20 May 2010 (Figs. 1 and 2c).

Mephitis mephitis (Schreber 1776)
Striped Skunk

Although voucher specimen records are lacking for a number of counties in Oklahoma, *M. mephitis* is distributed statewide (Caire et al. 1989; Stangl et al. 1992; Braun and Revelez 2005; Roehrs et al. 2008). Previously, four voucher specimens were collected in McCurtain County (Appendix). We provide a photographic voucher of *M. mephitis* from RSWMA, unit 44, taken by Berlin A. Heck on 19 February 2008 (Figs. 1 and 2d).

Procyon lotor (Linnaeus 1758)
Raccoon

P. lotor is documented statewide, although a number of counties lack voucher specimens (Caire et al. 1989; Clark and Tumlison 1992; Stangl et al. 1992; Braun and Revelez 2005; Roehrs et al. 2008). A specimen of this species was first collected in McCurtain County in 1968 and *P. lotor* is represented by four voucher specimens (Appendix). We provide a photographic record of this species taken sitting in a black willow on the south side of the levee separating units 6 and 8 on 24 May 2010 (by author ZPR; Figs. 1 and 2e). The individual pictured was one of three subadults seen together. This levee is intermittently wooded with black willow and cottonwood and is surrounded by *Baccharis* shrubland and bottomland hardwood parkland (Fig. 1; Table 1).

Sus domesticus (Erxleben 1777)
Domestic Pig

Historically included in the species *Sus scrofa* (wild boar) a recent ruling of the International Commission on Zoological Nomenclature has concluded domesticated populations and feral populations derived from domesticated stock be assigned to *S. domesticus* (Gentry et al. 2004). In the continental United States, self-reproducing and feral populations of domestic pigs are found in California and in the south from Florida to Texas and southern Appalachians to Oklahoma, with feral populations expanding to the north and southwest (Corn 2008). Feral populations of domestic pigs have been reported in almost every county throughout Oklahoma (Stevens 2010). Few voucher specimens document this species' distribution or natural history in Oklahoma. It is considered abundant in the major river basins of McCurtain County, especially in the lowlands along the Red River where RSWMA is located (Stevens 2010). There are three voucher specimens of domestic pigs collected in 1964 from McCurtain County (Appendix). Feral populations of domestic pigs are common on RSWMA and a fair amount of effort is expended to keep population numbers down through culling. For example, from 2004–2010, a mean of 95 domestic pigs per year (range = 62–137/year) were culled from RSWMA. We provide a photographic voucher of an individual of this species swimming across the borrow ditch of unit 5 taken on 8 June 2009 (by author WDA; Figs. 1 and 2f). While conducting our surveys, a large sow was observed on 22 May running as we hiked into an old pecan orchard (Fig. 1; Table 1). In a number of other cases domestic pigs were heard as they ran away from our approach, and signs of domestic pigs (tracks, trails, wallows) were common on RSWMA.

***Odocoileus virginianus* (Zimmermann 1780)**
White-tailed Deer

An account of *O. virginianus* in McCurtain County first appears in the literature during de la Harpe's 1719 trip through what is now Oklahoma when he talks about the hunters taking "roebucks" (Lewis 1924), but the first voucher specimen for this county was not collected until the 1970s and only five total voucher specimens represent this species in McCurtain County (Appendix). Although we did not collect any specimens of *O. virginianus* on RSWMA, both males and females of this species were observed on a number of occasions in forest and parkland habitat during the day and in more open environments near dusk and dawn (Fig. 1; Table 1). Tracks, trails, and rubs of this species were also common, and *O. virginianus* are regularly hunted successfully by Jack Ferguson on RSWMA (USFS Technician; personal com.). We provide a photographic voucher of *O. virginianus* taken by Berlin A. Heck on 25 July 2007 in Bittern Lake (Figs. 1 and 2g).

CONCLUSIONS

When this project started, 599 voucher specimens represented 48 species of mammals from McCurtain County. Twenty-eight species of mammals were known to be present on RSWMA according to area personnel, but prior to our survey only four species had been collected from RSWMA (*G. breviceps*, *Lynx rufus*, *R. fulvescens*, *S. hispidus*). To these data we add one new county record (*C. canadensis*), recorded seven species not previously known to be present on RSWMA (*L. borealis*, *L. seminolus*, *M. austroriparius*, *M. lucifugus*, *M. pinetorum*, *M. musculus*, *P. maniculatus*), and collected the first records for 27 mammals from RSWMA, with most records substantiated by voucher specimens. However, there are 17 species (*Blarina hylophaga*, *Corynorhinus rafinesquii*, *Lasiurus cinereus*, *Lepus californicus*, *Lynx rufus*, *Myotis leibii*, *M. septentrionalis*, *Nycticeius humeralis*, *Perimyotis subflavus*, *Peromyscus attwateri*, *Scalopus aquaticus*, *Sciurus carolinensis*, *S. niger*, *Sylvilagus floridanus*, *Tadarida brasiliensis*, *Tamias striatus*, *Urocyon cinereoargenteus*) from McCurtain County that were not collected in this study and further research to elucidate their status on RSWMA is warranted (Appendix).

It is well known that RSWMA provides important habitat for migratory birds, waterfowl, reptiles, and amphibians in Oklahoma and North America. Based on our results it is an important area for conservation and future studies of mammals as well. Many of these mammals are relatively under-studied in Oklahoma (e.g. *B. carolinensis*, *M. coypus*, *O. nuttalli*, *O. texensis*, *P. gossypinus*, *S. domesticus*) and management of wetlands on the RSWMA has created an ecosystem with some of the highest concentrations of *O. texensis* recorded in Oklahoma, and also seem to be productive for *L. canadensis*, a species of special concern in Oklahoma. Although true forest does not make up a large proportion of RSWMA, forested areas are important for biodiversity on RSWMA, providing habitat for a number of species including *G. volans*, *O. nuttalli*, and *P. gossypinus*. RSWMA provides important roost and foraging sites in bottomland forest habitats for *L. seminolus*, *M. austroriparius*, and *M. lucifugus*, all of which we know little about in Oklahoma. RSWMA also has a number of introduced species including *M. musculus*, *M. coypus*, and feral populations of *S. domesticus*, all of which appear to be a permanent part of the North American fauna, and RSWMA may be an ideal place (at least with respect to the latter two species) to study these species' ecology, natural history, and impact on native communities.

ACKNOWLEDGMENTS

We thank the U.S. Forest Service and Oklahoma Department of Wildlife Conservation for funding this project through State Wildlife Grant T-23-P, administered through the Oklahoma Cooperative Fish and Wildlife Research Unit (Oklahoma State University, Oklahoma Department of Wildlife Conservation, U.S. Geological Survey, Wildlife Management Institute, and U.S. Fish and Wildlife Service cooperating). We

also thank Robert Heinemann, Glenda Robinson and the Oklahoma State University, Kiamichi Forestry Research Station for allowing us to stay at their excellent facilities. Special thanks to Jack Ferguson of the U.S. Forest Service and Terry Stuart of the Oklahoma Department of Wildlife Conservation for their assistance on the ground, access to the area, facilities and equipment, and sharing their space and knowledge. Janet Braun of the Sam Noble Oklahoma Museum of Natural History, William Caire and Lynda Loucks at the University of Central Oklahoma Collection of Vertebrates, Larry Choate of East Central University, and Heath Garner at the Museum of Texas Tech University deserve thanks for their assistance with data collection. We also thank Karen McBee and Kim Hays of the OSU for all their work and support. A number of people assisted us in the field including Brandi Coyner, Andy Crosby, Richard Dolman, Dana Lee, and Jeremy Wilkinson. Finally, we thank James Shaw, Janine Powell and the two anonymous reviewers of this manuscript. Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

LITERATURE CITED

Arbour, D. W., and R. Bastarache. 2006. First confirmed record of American alligator nesting in Oklahoma. Proceedings of the Oklahoma Academy of Science 86:89–90.

Barrett, D. A., and D. M. Leslie, Jr. 2010. Current distribution of North American river otters in central and eastern Oklahoma, with seven new county records. Occasional Papers, Museum of Texas Tech University 294:1–13.

Blair, W. F. 1939. Faunal relationships and geographic distribution of mammals in Oklahoma. American Midland Naturalist 22:85–133.

Blair, W. F., and T. H. Hubbell. 1938. The biotic districts of Oklahoma. American Midland Naturalist 20:425–454.

Brabander, J. J., R. E. Masters, and R. M. Short. 1985. Bottomland hardwoods of eastern Oklahoma: a special study of their status trends and values. U.S. Fish and Wildlife Service and Oklahoma Department of Wildlife Conservation, Oklahoma City.

Braun, J. K., and M. A. Revelez. 2005. Distribution records and comments on Oklahoma mammals. Texas Journal of Science 57:3–24.

Braun, J. K., L. J. Vitt, J. P. Caldwell, M. A. Mares, and M. A. Revelez. 2011. Mammals from Le Flore County, Oklahoma. Southwestern Naturalist 56:410–417.

Caire, W., R. M. Hardisty, and K. E. Lacy. 1988. Capture heights and times of *Lasiurus borealis* (Chiroptera: Vespertilionidae) in southeastern Oklahoma. Proceedings of the Oklahoma Academy of Science 68:51–53.

Caire, W., and M. L. Thies. 1987. The Seminole bat, *Lasiurus seminolus* (Chiroptera: Vespertilionidae), from central Oklahoma. Southwestern Naturalist 32:273–276.

Caire, W., J. D. Tyler, B. P. Glass, and M. A. Mares. 1989. Mammals of Oklahoma. University of Oklahoma Press, Norman.

Cameron, G. N., and B. L. Kruchek. 2005. Use of coastal wetlands by hispid cotton rats (*Sigmodon hispidus*). Southwestern Naturalist 50:397–402.

Cameron, G. N., and S. R. Spencer. 1981. Sigmodon hispidus. Mammalian Species 158:1–9.

Carter, J., and B. P. Leonard. 2002. A review of the literature on the worldwide distribution, spread of, and efforts to eradicate the coypu (*Myocastor coypus*). Wildlife Society Bulletin 30:162–175.

Chapman, J. A., and G. A. Feldhamer. 1981. Sylvilagus aquaticus. Mammalian Species 151:1–4.

Clark, B. K., and B. S. Clark. 1996. Differential use of roadside fencerows and contiguous pastures by small mammals in southeastern Oklahoma. Southwestern Naturalist 41:54–59.

Clark, B. K., and B. S. Clark. 1997. Mist-net survey for endangered and candidate bat species on public lands in eastern Oklahoma. Report to the Oklahoma Department of Wildlife Conservation, Oklahoma City.

Clark B. K., and R. Tumlison. 1992. New records of mammals from Washita County, Oklahoma. Proceedings of the Oklahoma Academy of Science 72:37–38.

Corn, J. L. 2008. United States feral swine distribution. Southeastern Cooperative Wildlife Disease Study, College of Veterinary Medicine, University of Georgia, Athens. http://128.192.20.53/nfsms/index.jsp, accessed 11 November 2010.

Cross, H. 1917. Animal life in Oklahoma. Pp. 183–213 in Geography of Oklahoma. Bulletin No. 27. Oklahoma Geological Survey, Norman.

Cryan, P. M., C. U. Meteyer, J. G. Boyles, and D. S. Blehert. 2010. Wing pathology of White-nose Syndrome in bats suggests life-threatening disruption of physiology. BMC Biology 8:135.

Curtis, N. M., Jr., W. E. Ham, and K. S. Johnson. 2008. Geomorphic provinces of Oklahoma. Pg. 8 in Earth science and mineral resources of Oklahoma (K. S. Johnson, and K. V. Luza eds.). Oklahoma Geological Survey, Norman.

Dalquest, W. W., F. B. Stangl, Jr., and J. K. Jones, Jr. 1990. Mammalian zoogeography of a Rocky Mountain–Great Plains interface in New Mexico, Oklahoma, and Texas. Special Publications, Museum of Texas Tech University 34:1–78.

Davis, L. V. 1960. Geology and ground-water resources of southern McCurtain County, Oklahoma. Oklahoma Geological Survey, Bulletin 86:1–108.

Dolgos, A. G., and G. A. Earls. 1973. Observations on a nutria population in southeastern Oklahoma. Proceedings of the Oklahoma Academy of Science 53:109–110.

Fenneman, N. M. 1917. Physiographic subdivision of the United States. Proceedings of the National Academy of Sciences of the United States of America 3:17–22.

Fenton, M. B., and R. M. R. Barclay. 1980. Myotis lucifugus. Mammalian Species 142:1–8.

Fitch, H. S. 1954. Seasonal acceptance of bait by small mammals. Journal of Mammalogy 35:39–47.

Flores, D. L. 1985. Journal of an Indian trader: Anthony Glass and the Texas trading frontier, 1790–1810. Texas A&M University Press, College Station.

Gannon, W. L., R. S. Sikes, and the Animal Care and Use Committee of the American Society of Mammalogists. 2007. Guidelines of the American Society of Mammalogists for the use of wild mammals in research. Journal of Mammalogy 88:809–823.

Genoways, H. H., and J. R. Choate. 1998. Natural history of the southern short-tailed shrew, *Blarina carolinensis*. Occasional Papers, Museum of Southwestern Biology 8:1–43.

Gentry, A., J. Clutton-Brock, and C. P. Groves. 2004. The naming of wild animal species and their domestic derivatives. Journal of Archaeological Science 31:645–651.

Gettinger, D. 1991. New distributional records for rice rats (*Oryzomys palustris*) in Oklahoma. Proceedings of the Oklahoma Academy of Science 71:53.

George, S. B., J. R. Choate, and H. H. Genoways. 1981. Distribution and taxonomic status of *Blarina hylophaga* Elliot (Insectivora: Soricidae). Annals of Carnegie Museum 50:493–513.

Glass, B. P. 1958. The Seminole bat in Oklahoma. Journal of Mammalogy 39:587.

Glass, B. P., and A. F. Halloran. 1961. The small mammals of the Whichita Mountains Wildlife Refuge, Oklahoma. Journal of Mammalogy 42:234–239.

Glass, B. P., and C. M. Ward. 1959. Bats of the genus *Myotis* from Oklahoma. Journal of Mammalogy 40:194–201.

Hafner, M. S., W. L. Gannon, J. Salazar-Bravo, and S. T. Alvarez-Castañeda. 1997. Mammal collections in the western hemisphere: a survey and directory of existing collections. American Society of Mammalogists, Lawrence, Kansas.

Hanson, J. D., J. L. Indorf, V. J. Swier, and R. D. Bradley. 2010. Molecular divergence within the *Oryzomys palustris* complex: evidence for multiple species. Journal of Mammalogy 91:336–347.

Hatcher, R. T. 1984. River otters in Oklahoma. Proceedings of the Oklahoma Academy of Science 64:17–19.

Heck, B. A. 1998. Mountain lion cranium from McCurtain County, Oklahoma. Proceedings of the Oklahoma Academy of Science 78:127–128.

Heck, B. A. 2006. The American alligator (*Alligator mississippiensis*) in Oklahoma with two new early records. Proceedings of the Oklahoma Academy of Science 86:17–21.

Hoagland, B. W. 2000. The vegetation of Oklahoma: a classification for landscape mapping and conservation planning. Southwestern Naturalist 45:385–420.

Hoagland, B. W., and A. K. Buthod. 2004. Vascular flora of Hugo Lake Wildlife Management Area, Choctaw County, Oklahoma. Southeastern Naturalist 3:701–714.

Hoagland, B. W., and F. Johnson. 2004. The vascular flora of Red Slough and Grassy Slough Wildlife Management Areas, Gulf Coastal Plain, McCurtain County, Oklahoma. Castanea 69:284–296.

Hoagland, B. W., and N. A. McCarty. 2009. Composition and structure of bottomland forest vegetation at the Tiak Research Natural Area, McCurtain County, Oklahoma. Oklahoma Native Plant Record 9:38–58.

Hoagland, B. W., L. R. Sorrels, and S. M. Glenn. 1996. Woody species composition of floodplain forests of the Little River, McCurtain and LeFlore counties, Oklahoma. Proceedings of the Oklahoma Academy of Science 76:23–29.

Jenkins, S. H., and P. E. Busher. 1979. Castor canadensis. Mammalian Species 120:1–8.

Jojola, S., G. Witmery, and D. Noltez. 2005. Nutria: an invasive rodent pest or valued resource? Pp. 120–126 in Proceedings of the 11th Wildlife Damage Management Conference, Traverse City, Michigan, 16–19 May 2005 (D. L. Nolte, and K. A. Fagerstone, eds.). National Wildlife Research Center, Fort Collins, Colorado.

Jones, C., and R. W. Manning. 1989. Myotis austroriparius. Mammalian Species 332:1–3.

Jones, G. E. 1952. Survey of existing beaver range in Oklahoma. Federal Aid Division Project W S1-R2, Completion Report. Oklahoma Game and Fish Department, Oklahoma City.

Kaufman, D. W., and G. A. Kaufman. 1990. House mice (*Mus musculus*) in natural and disturbed habitats in Kansas. Journal of Mammalogy 71:428–432.

Kruchek, B. L. 2004. Use of tidal marsh and upland habitats by the marsh rice rat (*Oryzomys palustris*). Journal of Mammalogy 85:569–575.

Krupa, J. J. 1986. Distribution in Oklahoma of the bird-voiced treefrog (*Hyla avivoca*). Proceedings of the Oklahoma Academy of Science 66:37–38.

Larivière, S. 1999. Mustela vison. Mammalian Species 608:1–9.

Larivière, S., and L. R. Walton. 1998. Lontra canadensis. Mammalian Species 587:1–8.

LaVal, R. K. 1970. Infraspecific relationships of bats of the species *Myotis austroriparius*. Journal of Mammalogy 51:542–552.

Lewis, A. 1924. La Harpe's first expedition in Oklahoma, 1718–1719. Chronicles of Oklahoma 2:331–349.

Linzey, D. W., and R. L. Packard. 1977. Ochrotomys nuttalli. Mammalian Species 75:1–6.

Little, E. L., Jr., and C. E. Olmsted. 1936. Trees and shrubs of the southeastern Oklahoma Protective Unit. Proceedings of the Oklahoma Academy of Science 16:52–61.

Loomis, N. M., and A. P. Nasatir. 1967. Pedro Vial and the roads to Santa Fe. University of Oklahoma Press, Norman.

Marcy, R. B. 1854. Mammals. Pp. 200–201 in Exploration of the Red River of Louisiana in the year 1852: with reports on the natural history of the country, and numerous illustrations. Beverley Tucker, Washington D. C.

McCarley, W. H. 1951. Color mutations in a small, partially isolated population of pocket gophers (*Geomys breviceps*). Journal of Mammalogy 32:338–341.

McCarley, W. H. 1954. Fluctuations and structure of *Peromyscus gossypinus* populations in eastern Texas. Journal of Mammalogy 35:526–532.

McCarley, W. H. 1961. New locality records for some Oklahoma mammals. Southwestern Naturalist 6:108–109.

McCay, T. S. 2001. Blarina carolinensis. Mammalian Species 673:1–7.

McDonald, B. 2006. Distribution, abundance, and habitat affinities of Oklahoma muskrats (*Ondatra zibethicus*): new insight from trapper reports. Proceedings of the Oklahoma Academy of Science 86:39–45.

McDonald, B. K., J. A. Sparks, and M. S. Husak. 2007. A new record of the southern flying squirrel (*Glaucomys volans*) in southern Oklahoma. Proceedings of the Oklahoma Academy of Science 87:103–105.

McDonald, B. K., P. W. Wilson, and W. Caire. 2006. New county records of Oklahoma mammals based on remains identified in owl pellets. Proceedings of the Oklahoma Academy of Science 86:47–52.

McManus, J. J. 1974. Didelphis virginiana. Mammalian Species 40:1–6.

Meek, L. 2005. Red Slough Wildlife Management Area. Outdoor Oklahoma May/June 2005:38–43.

Meteyer, C. U., E. L. Buckles, D. S. Blehert, A. C. Hicks, D. E. Green, V. Shearn-Bochsler, N. J. Thomas, A. Gargas, and M. J. Behr. 2009. Histopathologic criteria to confirm White-nose Syndrome in bats. Journal of Veterinary Diagnostic Investigations 21:411–414.

Nuttall, T. 1821. A journal of travels into the Arkansas Territory: during the year 1819. With occasional observations on the manners of the aborigines. Illustrated by a map and other engravings. Thomas H. Palmer, Philadelphia, Pennsylvania.

OCS. 2010. Idabel: climatological summary. CLIMOCS, Oklahoma Climatological Survey, Norman. http://climate.mesonet.org/coop.php, accessed 29 November 2010.

Omernik, J. M. 2007. Level III ecoregions of the continental United States (map scale 1:250,000). National Health and Environmental Effects Research Laboratory, U.S. Environmental Protection Agency, Corvallis, Oregon.

Ortenburger, A. I. 1926a. The University of Oklahoma Museum of Zoology expedition of 1925. Proceedings of the Oklahoma Academy of Science 6:85–88.

Ortenburger, A. I. 1926b. Some bats from Oklahoma. Proceedings of the Oklahoma Academy of Science 6:122.

Osgood, W. H. 1909. Revision of the mice of the American genus *Peromyscus*. North American Fauna 28:1–285.

Payne, T., and W. Caire. 1999. Species diversity of small mammals in the Tallgrass Prairie Preserve, Osage County, Oklahoma. Proceedings of the Oklahoma Academy of Science 79:51–59.

Platt, S. G., Z. Fast Horse, T. R. Rainwater, and S. M. Miller. 2009. Distribution records and comments on mammals in western South Dakota. Western North American Naturalist 69:329–334.

Pocock, M. J., H. C. Hauffe, and J. B. Searle. 2005. Dispersal in house mice. Biological Journal of the Linnean Society 84:565–583.

Pournelle, G. H. 1952. Reproduction and early postnatal development of the cotton mouse, *Peromyscus gossypinus gossypinus*. Journal of Mammalogy 33:1–20.

Raesly, E. J. 2001. Progress and status of river otter reintroduction projects in the United States. Wildlife Society Bulletin 29:856–862.

Reasoner, R. C. 1974. Soil survey, McCurtain County, Oklahoma. U.S. Department of Agriculture, Soil Conservation Service, Government Printing Office, Washington D.C.

Reynolds, R. E. 1977. Distribution of beaver in Oklahoma. Proceedings of the Oklahoma Academy of Science 57:83–85.

Riedle, J. D., P. A. Shipman, S. F. Fox, and D. M. Leslie, Jr. 2005. Status and distribution of the alligator snapping turtle, *Macrochelys temminckii*, in Oklahoma. Southwestern Naturalist 50:79–84.

Roehrs, Z. P., B. S. Coyner, K. N. King, D. L. Martinez, J. K. Braun, M. J. Hamilton, D. M. Leslie, Jr., and R. A. Van Den Bussche. 2008. New records of mammals from western Oklahoma. Occasional Papers, Museum of Texas Tech University 273:1–15.

Saugey, D. A., R. L. Vaughn, B. G. Crump, and G. A. Heidt. 1998. Notes on the natural history of *Lasiurus borealis* in Arkansas. Proceedings of the Arkansas Academy of Science 52:92–98.

Schnell, G. D., J. A. Grzybowski, D. J. Hough, and T. M. McKenna. 1985. Evaluation of spatial patterning in Oklahoma furbearer populations. Southwestern Naturalist 30:225–238.

Shackelford, J., and J. Whitaker. 1997. Relative abundance of the northern river otter, *Lutra canadensis*, in three drainage basins of southeastern Oklahoma. Proceedings of the Oklahoma Academy of Science 77:93–98.

Sheffield, S. R., and B. R. Chapman. 1992. First records of mammals from McCurtain County, Oklahoma. Texas Journal of Science 44:491–492.

Spencer, S. R., and G. N. Cameron. 1982. Reithrodontomys fulvescens. Mammalian Species 174:1–7.

Stangl, F. B., Jr., W. W. Dalquest, and R. J. Baker. 1992. Mammals of southwestern Oklahoma. Occasional Papers, Museum of Texas Tech University 151:1–47.

Stevens, R. L. 2010. The feral hog in Oklahoma, Second Ed. Samuel Roberts Noble Foundation, Agricultural Division, Ardmore, Oklahoma.

Sulentich, J. M., L. R. Williams, and G. N. Cameron. 1991. Geomys breviceps. Mammalian Species 383:1–4.

Taulman, J. F., and L. W. Robbins. 1996. Recent range expansion and distributional limits of the nine-banded armadillo (*Dasypus novemcinctus*) in the United States. Journal of Biogeography 23:635–648.

Taylor, R. J. 2005. Relationship of forest vegetation to soils on geological formations of the Oklahoma Gulf Coastal Plain. Oklahoma Native Plant Record 5:4–38.

Thies, M., T. L. Payne, and W. Caire. 1993. The eastern harvest mouse, *Reithrodontomys humulis*, in north central Oklahoma. Proceedings of the Oklahoma Academy of Science 73:79–80.

Tumlison, R., and R. Bastarache. 2007. New records of the badger (*Taxidea taxus*) in southeastern Oklahoma. Proceedings of the Oklahoma Academy of Science 87:107–109.

Tyler, J. D., and C. M. Scott. 1982. Status and distribution of *Lasiurus cinereus* (Chiroptera: Vespertilionidae) in Oklahoma. Proceedings of the Oklahoma Academy of Science 62:91–92.

USFS. 2009. Red Slough Wildlife Management Area. Map. U.S. Forest Service, Hochatown, Oklahoma. http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5163336.pdf, accessed 5 October 2009.

Whitaker, H. L. 1937. Occurrence of the Texas rice rat in Oklahoma. Journal of Mammalogy 18:95–107.

Whitaker, J. O., Jr. 1974. Cryptotis parva. Mammalian Species 43:1–8.

White, J., and J. Hoagland. 1997. Additional observations of the long-tailed weasel (*Mustela frenata*) and the river otter (*Lutra canadensis*) in southeastern Oklahoma. Proceedings of the Oklahoma Academy of Science 77:111–112.

Wilkinson, D. L., K. Schneller-McDonald, R. W. Olson, and G. T. Auble. 1987. Synopsis of wetland functions and values: bottomland hardwoods with special emphasis on eastern Texas and Oklahoma. U.S. Fish and Wildlife Service. Biological Report 87(12). 132 pp.

Wolfe, J. L. 1982. Oryzomys palustris. Mammalian Species 176:1–5.

Woods, A. J., J. M. Omernik, D. R. Butler, J. G. Ford, J. E. Henley, B. W. Hoagland, D. S. Arndt, and B. C. Moran. 2005. Ecoregions of Oklahoma (map scale 1:1,250,000). U.S. Geological Survey, Reston, Virginia.

Woods, C. A., L. Contreras, G. Wilner-Chapman, and P. Whidden. 1992. Myocastor coypus. Mammalian Species 398:1–8.

Addresses of authors:

ZACHARY P. ROEHRS

Oklahoma State University
Department of Zoology
Stillwater, OK 74078

Current Address:
Department of Biology
Laramie County Community College
Cheyenne, WY 82007
zroehrs@lccc.wy.edu

JUSTIN B. LACK

Oklahoma State University
Department of Zoology
Stillwater, OK 74078
justin.lack@okstate.edu

CRAIG E. STANLEY, JR.

Oklahoma State University
Department of Zoology
Stillwater, OK 74078

Current Address:
Department of Biology
Temple University
Philadelphia, PA 19122
craig.stanley@temple.edu

CHRISTOPHER J. SEIDEN

Oklahoma State University
Department of Zoology
Stillwater, OK 74078
cseiden@okstate.edu

ROBERT BASTARACHE

U.S. Forest Service
Oklahoma Ranger District
Ouachita National Forest
Route 4, Box 2900
Broken Bow, OK 74728

W. DAVID ARBOUR

Oklahoma Department of Wildlife Conservation
Route 4, Box 2900
Broken Bow, OK 74728

MEREDITH J. HAMILTON

Oklahoma State University
Department of Zoology
Stillwater, OK 74078
meredith.hamilton@okstate.edu

DAVID M. LESLIE, JR.

U.S. Geological Survey
Oklahoma Cooperative Fish and Wildlife Research Unit
Oklahoma State University
Stillwater, OK 74078
cleslie@usgs.gov

RONALD A. VAN DEN BUSSCHE

Oklahoma State University
Department of Zoology and Collection of Vertebrates
Stillwater, OK 74078
ron.van_den_bussche@okstate.edu

APPENDIX

Mammal voucher specimens from McCurtain County. Museum abbreviations follow that of Hafner et al. (1997): East Central University (ECU), Museum of Texas Tech University (TTU), Oklahoma State University, Collection of Vertebrates (OSU), Sam Noble Oklahoma Museum of Natural History (OMNH), Sternberg Museum of Natural History (MHP), Texas A&M University, Texas Cooperative Wildlife Collection (TCWC), United States National Museum of Natural History (USNM), University of Central Oklahoma, Collection of Vertebrates (UCOCV), University of Illinois, Museum of Natural History (UIMNH), University of Kansas, Museum of Natural History (KU), University of Michigan, Museum of Zoology (UMMZ), and University of Texas at El Paso, Centennial Museum (UTEP). Previously collected voucher specimens with bolded numbers were collected on Red Slough Wildlife Management Area. New voucher specimens are deposited in the OSU Collection of Vertebrates, but are currently uncataloged, so tissue (OK) or personal collection numbers (ZPR) are reported.

Species	Previous Vouchers	New Vouchers
Didelphis virginiana	ECU 432, OMNH 3077–3078	OK 11740
Dasypus novemcinctus	UCOCV 773, UTEP 4380	Figure 2a
Sciurus carolinensis	KU 166684, OSU 8752, 10018, 11820, 12049, 12101, UCOCV 4445, UTEP 5954–5955	
Sciurus niger	OMNH 5944–5946, 15683, OSU 4185, 10019, UCOCV 4472	
Glaucomys volans	OMNH 16941, OSU 12103	OK11747
Tamias striatus	OMNH 4446, OSU 10075	
Castor canadensis		OK 11739, 11741, 11848–11849
Geomys breviceps	OMNH 5688, OSU 2553–2554, 10959, 12044, 12052, 12102, UMMZ 99763	Ouachita National Forest Office
Microtus pinetorum	ECU 346, OMNH 15689, OSU 9956, 10204, UCOCV 4796–4797	OK11812, ZPR-0987
Neotoma floridana	KU 41376–41377, OMNH 441, 1010, 3808–3809, 5587–5593, 6985, 7643, UTEP 4326–4327, TCWC 46363, 46371–46373	OK11714, 11735, 11742, 11745, 11787, 11802, 11804

APPENDIX (CONT.)

Ochrotomys nuttalli	OMNH 3803–3806, 19861–19862, OSU 3129	OK11727, 11732, 11736, 11743–11744, 11746
Peromyscus attwateri	MHP 30, OMNH 82, 1901, 4525–4528, 5113–5127, UCOCV 5053, TCWC 46441, UTEP 4330–4331	
Peromyscus gossypinus	OMNH 6009, 6980–6981, 6983–6984, 11066–11083, 15686–15687, 15722, 19863–19868, OSU 11680, TTU 89583–89584, UCOCV 904, 5047, 5311–5329, UIMNH 11800–11801, UMMZ 129162–129166	OK 11702, 11709, 11711, 11718, 11722, 11724, 11748–11749, 11755–11759, 11770, 11796, 11808, 11810, 11813, 11827, 11833, 11835, 11841
Peromyscus leucopus	OMNH 3802, 4978–4979, 13865–19869, OSU 1822–1823, TCWC 46734, UCOCV 1427, 1701, 5000, 5012, 5021–5023, 5054, 5305–5310, 5335–5344	OK 11700, 11705, 11720, 11723, 11725, 11764, 11806, 11819, 11821, 11826, 11845
Peromyscus maniculatus	OMNH 6982, 17054–17059, UCOCV 4937, 4993	OK 11776, 11815, 11817, 11820, 11874
Reithrodontomys fulvescens	OMNH 4029–4032, 19857–19859, TTU 91083, **UCOCV 4745**, UIMNH 11765–11766, UTEP 4328–4329	OK 11699, 11704, 11710–11711, 11713, 11726, 11728, 11730, 11750, 11780, 11782, 11805, 11807, 11828, 11834, 11837, 11840
Oryzomys texensis	OMNH 4033–4034, 19850–19854, UIMNH 11739–11741	OK 11703, 11706–11707, 11716–11717, 11719, 11762, 11769, 11774, 11777–11778, 11789, 11792, 11811, 11814, 11816, 11825, 11829, 11832, 11836, 11838
Sigmodon hispidus	OMNH 4785, 4787, 6970–6979, TTU 110404, UCOCV 1400, 1461, **4359–4360**, **4451**, **4474**, **4477**, **4494**, **4496**, **4503**, **4506**, 4694, 4717, 5194, 5272, **5409**, UIMNH 11828–11836	OK 11701, 11715, 11721, 11729, 11733–11734, 11760–11763, 11765–11766, 11790–11791, 11793–11795, 11797, 11822, 11830, 11843
Mus musculus	OMNH 19856	OK 11842
Myocastor coypus	ECU 692	OK 11738
Lepus californicus	TTU 4216	
Sylvilagus aquaticus	OMNH 5914, OSU 527, 10068	Figure 2h
Sylvilagus floridanus	OMNH 5915–5919, OMNH 11055	
Blarina carolinensis	ECU 319, 345, OMNH 3887, 19860, 36257, OSU 4878	OK 11708, 11737, 11754, 11803, 11824, 11846
Blarina hylophaga	KU 166653, TTU 93948, UCOCV 4411	
Cryptotis parva	TTU 92996	OK 11731, 11768, 11771, 11779, 11781, 11783, 11785–11786, 11788, 11799, 11801, 11818, 11831, 11839, 11844, 11847, 11850

APPENDIX (CONT.)

Scalopus aquaticus	UCOCV 2002, TTU 92991	
Eptesicus fuscus	OMNH 3904–3905, 5868, 287963, OSU 1885, 2365, 2835–2852, 3148, TTU 4308–4309, UCOCV 2091	
Lasiurus borealis	OMNH 600, 4252–4275, 5887, 11016–11021, 11048, 15690, 16327, 16532, 19855, OSU 2352–2353, 2356–2357, 2819, 3050, 3052, 3054, 3073, 3081, 3178–3179, 3182–3183, 3191–3192, 3196–3198, 3200–3202, 6520, TCWC 7660, UCOCV 2064	OK 11800, 11809
Lasiurus cinereus	OSU 3069	
Lasiurus seminolus	OSU 2355, UCOCV 1980	OK 11753
Nycticeius humeralis	OMNH 595, 3827–3855, 13864, 16448-16462, OSU 2392–2393, 2395, 2399–2400, 2860, 3068, 3110, 3139, 3187, 3195, 3340, TCWC 7679, TTU 92994–92945, UCOCV 2104	
Perimyotis subflavus	OMNH 3888–3903, 11007, 15717–15719, 16443–16447, OSU 2376, 2402–2403, TTU 4307, 92998–92999, UCOCV 1369, USNM 246081	
Corynorhinus rafinesquii	OMNH 5871–5874, 7632	
Myotis austroriparius	KU 99391, OSU 2853–2854, 3051, 3055, 3064, 3194, 3206–3210	OK 11773, 11775
Myotis leibii	OSU 8066	
Myotis lucifugus	OSU 2332, 2901–2915, 3039, 3103, 3107, 3128, 3132–3133, 3147, 3161, 3165, 3189, 3219, 6540, 6545–6546	OK 11772
Myotis septentrionalis	UCOCV 2093	
Tadarida brasiliensis	OSU 3067, UCOCV 2067–2073, 4422	
Lynx rufus	OSU 1610, 1662, 9942, **10206**, 11157, 11162, 11177, 11182–11184, 11187, 11197, 11203, 11210, 11214, 11220, 11224–11225, 11235, 11241, 11244–11245, 11255, 11268, 11277–11278, 11280, 11289–11291, 11296, 11342, 11366, 11371, 11418, 11430–11431, 11452, 11456, 11467, 11470, 11517, 12187–12189, 12192–12193, 12195–12196, USNM 232415, 234423–234424	
Canis latrans	OMNH 2957, 9885–9889, OSU 10261, UCOCV 130, USNM 289155, 289157–289160, 289164	Figure 2b

APPENDIX (CONT.)

Urocyon cinereoargenteus	OSU 8751	
Lontra canadensis	OSU 13280, UCOCV 4244	OK 11798
Neovison vison	ECU 452	Figure 2c
Mephitis mephitis	OMNH 4057, 4115, 11084, OSU 11311	Figure 2d
Procyon lotor	OMNH 7554, OSU 10725, 12051, UTEP 4254	Figure 2e
Sus domesticus	ECU 435–436, 440	Figure 2f
Odocoileus virginianus	ECU 439, OSU 8725, 8745, 9617, 11955	Figure 2g

PUBLICATIONS OF THE MUSEUM OF TEXAS TECH UNIVERSITY

This publication is available free of charge in PDF format from the website of the Natural Science Research Laboratory, Museum of Texas Tech University (nsrl.ttu.edu). The authors and the Museum of Texas Tech University hereby grant permission to interested parties to download or print this publication for personal or educational (not for profit) use. Re-publication of any part of this paper in other works is not permitted without prior written permission of the Museum of Texas Tech University.

Institutional subscriptions to Occasional Papers are available through the Museum of Texas Tech University, attn: NSRL Publications Secretary, Box 43191, Lubbock, TX 79409-3191. Individuals may also purchase separate numbers of the Occasional Papers directly from the Museum of Texas Tech University.

Series Editor: Robert J. Baker
Production Editor: Lisa Bradley

museum
texas tech university

ISSN 0149-175X

Museum of Texas Tech University, Lubbock, TX 79409-3191